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APPEAL BRIEF

(1)- Real party in interest.

Schwartz, et al.
Erwin Schwartz and Peter Lipert

(2)- Related appeals and interferences

Response to petition under 37 C.F.R. & 1.137(b) being GRANTED.
Dated June 23 2004.

(3)- Status of claims

Petition under 37 C.F.R. & 1.137(b) being GRANTED.
Dated June 23 2004.

(4)- Status of amendments

Response to petition under 37 I.E. & 1.137(b) being GRANTED.
Dated June 23 2004.

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(5) – Summary of invention

Description of the Heat Exchanger

Line 1 - A Heat Exchanger specifically designed for Heating or Cooling of liquids
Containing SOLID MATERIALS, Organic Solids and Inorganic Materials that
are viscous, sticky and stingy, in such unique applications as:

- a) Heating of incoming Cold Raw Sludge in Anaerobic Digesters in the Municipal Waste Water Treatment Facilities as a Hot Water-to-Sludge heater.
- b) Recovery of heating energy otherwise lost from treated outgoing sludge in Anaerobic Digesters in the Municipal Waste Water Treatment Facilities as a Sludge-to-Sludge
Line 10 Heat Recovery Unit.

c) Heating or Cooling of Industrial Slurries as a hot water heat exchanger or a cooling unit

Refer to FIG. 1 and FIG. 2 and FIG. 7

The Heat Exchanger comprises of horizontally permanently fixed heating plates (12) to define between adjacent heating plates an area of sealed passages for two heat exchanging fluids.

Line 20 The outer frame comprises of two access doors (20) and two outer walls (26). Two outer door frames (24) to form a permanently fixed rigid structure to provide liquid tight enclosure.

Each heating plate (12) composed of channels for conducting of the cold or hot liquid sludge In-line and in Counter-flow fashion.

The heating plate (12) comprises of vertical directional baffles (14) and round solid bars (34) attached at the end of (14), in order to reduce the risk of plugging with stringy material.

Line 30 Each directional baffle (14) has a few PRESSURE RELIEF HOLES (37), or (38) or (39) in Fig. 7. The pressure relief holes has shapes of Square, Triangular or Semi-Circular. Each of said channel means being defined by a pair of said heating plates (12) disposed on next to the other and by a pair of directional baffles (14 and an internal return bend means (18).

The internal return bend (18) having a configuration allowing direct access to said channel, means at least at one end removable, without the necessity to dismantle the entire heat exchanger, the other end could be permanently fixed and liquid tight.

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The External return bends (22) having a predetermined configuration to provide a **greater turbulence** of the liquid passing through each said channels, said external return bend being

Line 40 incorporated into and extending outwardly from said walls (26) and permanently attached to outer door frame (24). The said heat exchanger further comprising of two access doors (20) which are removable and sealed in a liquid tight fashion to allow accessibility simultaneously from two opposite directions without dismantling the entire unit, said doors being of substantially flat configuration

Line 47 **We Claim.**

24R -Internal return bends (18) having a predetermined configuration adapted to provide a greater flow turbulence fluid passing through each said channels (as per fig. 1 and fig. 11).

Line 50 The internal return bend (18) is a rigid continuous flat plate bent in many inward and outward **semi- hexagonal** shapes (fig. 11).

25R-The inner return bends (18) are **permanently** fixed between adjacent heating plates (12) to provide **liquid-tight conditions under high pressure for Liquid Fluid.**

29R-The inner return bend (18) can be **removable** between adjacent heating plates (12) to provide liquid-tight conditions for liquid fluid under high pressure and enable cleaning.

Line 60 **31R**-The vertical directional baffles (14) is provided with round sold **bars** (34) (fig. 2) attached at the end of (14), in order to reduce the risk of plugging with stringy materials.

32R-The EXTERNAL return bends (22) means having in cross-section of a **semi-octagonal** configuration in order to provide a **greater flow turbulence** of the fluid passing through.

38R-Each directional baffle (14) has a few **PRESSURE RELIEF HOLES** (37), (38) or (39) in fig. 7. The pressure relief holes are located at the extreme BOTTOM or Top, and have shape of Square, Triangular or Semi-Circular.

Line 70 THE PRESSURE RELIEF HOLES (ORIFICES) ALLOW the **REDUCTION OF PRESSURE FROM BUILD UP, IN CASE OF BLOCKAGE BETWEEN ADJURING CHANNELS.**

The pressure relief holes are located at the extreme of the directional baffle (14) where the liquid starts to fill up.

40R-The Inlet flanges (28) and (30) comprise a **unique transition** from **SQUARE CHANNEL to ROUND TUBE, for Liquid Fluids** adapted to connect said inlet in a special manner, which **will cause any blockage to occur outside, before or after, of the heat exchanger,** due to the reduced passage AREA of the liquid.

Line 80

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With added feature of possibility to put 2 Flanges, like that, in serial and connected in the narrowest side.

When the two transitions in Fig. 18 and Fig. 19 are connected together at the rectangular narrower ends, they form a natural restriction in which preferred location plugging first occurs

(6)- Issues

We hereby shorten the application and description in order to obtain a speedy patent at least on a few of the initial claims.

Please note that claims 23-42 are rewritten with more clarity, and I will refer to them as 23R- 42R (revised).

Please note that all initial drawings and figures still apply and are not withdrawn

A note of importance:

During the past several years we had been in contact with engineering experts in the field of Sludge Heating in anaerobic digestion and other applications liquids containing foreign materials. These experts agree that our unit when applicable to Recovery of Energy in the Sludge Treatment is new and unique in its application and therefore we think that the claims that we refer to should be patentable. Other existing technology, such as Spiral exchangers or Tube in Tube exchangers fail miserably in this application, due to poor design details.

We have received advice form many Professional Engineers, and have received support from Canadian and Quebec governments who both approved our project as innovative and provided assistance for R&D.

The issues are related to claims 24, 25, 29, 31, 32, 38, 40 that now are 24R, 25R, 29R, 31R, 32R, 38R, 40R claims

We believe that **the patent of Ahlberg (priority date and international Publication date was 24 February 1984), so 20 years has passed and the patent EXPIRED.**

(And also LAPSED in

<http://v3.espacenet.com/legal?DB=EPODOC&IDX=CA1309708&F=0&QPN=CA1309708> (patent

EXPIRED

51

CA F 479214 A (Patent of invention)

PRS Date : 2003/04/03

PRS Code : MKLA

Code Expl.: - EXPIRED

EFFECTIVE DATE: 20021104

1

We believe also that the patent of Dorazio 4,466,482 with Date of Patent Aug 21 1984 and filed Nov 27 1981 (so 20 years has passed), the patent is EXPIRED as of 22 August 2004.

(7)- Grouping of claims-

Each claim is separate.

(8)- Arguments

Mainly For claim 24R, 25R and 29R

the patent of Ahlberg 1,309,708 filed Feb 24 1984, so 20 years has passed and the patent is EXPIRED

In the expired patent of Ahlberg the layers CLAMPED to each other. Our invention has each layer welded in 2 sides.

The patent of Ahlberg fails to disclose:

- a) the flow being unique COUNTER-FLOW and IN-LINE,
- b) also vertical and permanently fixed plates and internal bends and external bends being SEMI-HEXAGONAL shaped in order to promote greater turbulence and thus better heat transfer efficiency.

The patent of Ahlberg claims "An apparatus according to claim 1, characterized in that the speed of the medium in bends of the duct means is variable in relation to the speed of the medium in straight portions of the duct means".

http://patents1.ic.gc.ca/claims?patent_number=1309708&language=EN

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While our invention yields CONSTANT flow in the channels, in order to reduce pressure drop.

The Patent of Urch 5,078,208 specify PERMANENTLY FIXED internal bends and this patent does not allow for REMOVABLE bends to get access to internals as is our invention.

It also allows for "SOME LEAKAGE OF THE FLUIDS BETWEEN THE PASSAGES MAY TAKE PLACE" (see line 10 page 1). Our Heat Exchanger does not allow ANY Leakage between the two medias, as it will contaminate the Water in the plant with SLUDGE from the other liquid.

In line 68 page 3 Urch states "Throughout the embodiments the fluid used is GASEOUS eg. AIR". (also page 4 line 32). Urch design could not work with LIQUIDS and further more, not with liquids with High % of Solids in them, as is our invention.

Urch unit is designed for handling Gases and it is built from METAL FOIL (see page 4 line 9), a rather fragile material that would fail in our application from the very start due to high pressures, and it will never work with high pressured liquid with solids in them.
(Also see page 8 line 34) "Foil thickness of 0.05 mm. To 0.01 mm. Have been found to be adequate for carrying out the invention".

Urch object of invention (as per page 2 line 7 and 8) is " to provide an improved isolating heat exchanger", it has nothing to do with our invention which allows for passages of liquids containing high percent solids even of abrasive nature.

Urch DOES NOT HAVE INTERNAL RETURN BENDS in the end AT ALL.

We have Internal bends in the end of each channel in order to conduct the flow of the Liquid fluid, at the end of the channels.

Urch does not have in-line and counter flow, and semi-hexagonal return bends in the LAYER it self in its channels as is in our unit, but as an external manifolds (15, 17).

The Examiner refers to the patent of Dorazio with regards to Semi-hexagonal configuration and Transition means. The patent of Dorazio 4,466,482 with Date of Patent Aug 21 1984 and filed Nov 27 1981 (so 20 years has passed), the patent is EXPIRED.

Also in

24R- Our design applies for FLUID LIQUIDS, especially for liquids with high % of solids in them and stringy materials that otherwise would block small passages.

29R- This INNER Bends are REMOVABLE

This allows for quick access for Inspection and cleaning of the inside, while maintaining the possibility of high pressure flow OF LIQUIDS with stringy material in the flow.

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31R- We have a unique design of straight directional baffle WITH ADDITIONAL LARGER DIAMETER ROUND BAR AT THE END, IN ORDER TO AVOID STRINGY MATERIAL, IN SLUDGE FLOW, FROM BEING STUCK AT IT.

It is not there to smooth out the fluid flow as in the patent by Kadle 5,111,878 (Kadle was mentioned by the Examiner).

Kadle patent is for **AIR, not for liquids.** (see Abstract).

Kadle patent refers to TUBE. Our design has SQUARE CHANNELS.

Kadle patent has RIBS for flow of air. Our design has no ribs.

Kadle has rounded-off ends of a tube. Our Design Welds a SOLID BAR in the end of a flat bar, this is completely different design, as it is a Thicker round Bar stuck up to a smaller flat end bar (please see our fig 34)

Kadle on page 1 lines 41-42 states "centralized divider rib of U-flow type tubes of an evaporator for an air conditioner".

Our design has no ribs, is not from tube, and not for air.

Again no one is claiming patent for a metal Bar, or a round metal, our usage of Round BAR to weld to a flat divider for Sludge liquids fluids, has nothing to do with Kadle.

32R- The Semi Octagon shape will increase the Turbulance flow which is beneficial for improved heat transfer.

38R- We have a unique design of PRESSURE RELIEF HOLES (ORIFICES) THAT ALLOW REDUCTION OF PRESSURE FROM BUILD UP, IN CASE OF BLOCKAGE BETWEEN ADJOINING Channels.

It is not there to allow the main flow of gas or liquid, and NOT FOR THE PURPOSE OF REDUCING LARGE TEMPERATURE DIFFERENTIALS via "Pin holes" as per the patent by Abraham (Patent # 5,323,851) and referred to by the Examiner.

In our case it is Pressure relief, nothing to do with Temperature.

Our pressure relief holes are located at the VERY Bottom of the vertical dividers where the liquid starts to fill up.

Not in the middle as in Abraham's.

Ours is not a round circle in the middle. See Fig 7.

Abraham patent is for air cooling, (see page 1 line 2," ...to air conditioners for use on motor

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vehicles...).

Our patent is not for air.

We do not ask for a patent for a hole in a metal. (or in the side of a channel), but for the unique Purpose, usage, benefit, innovation in this application, as described above for Fluid Liquids with high % of solids in them i.e. Sludge).

40R- Of course transitional tubes and conduits are not new.

However in our case the inlet and outlet connections merit double duty:

1- unique transition from **SQUARE CHANNEL**, out to **ROUND TUBE**.

2- so as to have any **blockage**, in the Channels, **before or after the Heat Exchanger.**"

(to create an obstruction at the inlet connection of smaller diameter that will catch bigger solids at the entry to the heat exchanger where it can be removed with ease).

((Example: for a channel of say 3" by 6" (area 18 sq inch), there will be a tube INLET of 4" Dia (area of 12.6 inch square) connected via the **SPECIALLY designed** (by an Engineer) Inlet Flange that **will cause the sludge to be blocked in the Inlet flange, before entering the Heat Exchanger.** For the exit side it can be wise versa to an outlet tube of 6" Dia (area of 28.3 square inch)).

The examiner refers to the patent of Dorazio (4,466,482) re transition means to connect inlet and outlet having semi-hexagonal configuration, which is NOT for the same purpose.

Dorazio,s patent is for "**GAS TO BE HEATED**", (please see the Abstract 57, or page 1 line 10 and page 2 line 42).

.And his invention is for" **CERAMIC CROSS-FLOW**" (page 1, line 4). Our invention used with **METALS** and NOT IN**CROSS-FLOW**.

His invention is NOT for **BLOCKING** Sludge Liquids with solids in them.

Dorazio's patent is not for transforming SQUARE CHANNEL out to ROUND TUBE for Fluid liquids.

In any case, the patent of Dorazio with Date of Patent Aug 21 1984 and filed Nov 27 1981 (so 20 years has passed), the patent has EXPIRED

Our claim is for special reducing flange that will create artificial blockage Outside of the Heat Exchanger internals to capture larger size solids which otherwise would block exchanger internals and would be much more difficult to remove.

We do not invent the circle, nor the square shape, nor the piping, but a

1- special flange that will cause any blockage to happen OUTSIDE the Heat Exchanger and for liquid fluids.

2- With added feature of possibility to put 2 Flanges, like that, in serial and connected in the narrowest side.

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(9)- Appendix.

Claims.

Line 1 - A Heat Exchanger specifically designed for Heating or Cooling of liquids
Containing **SOLID MATERIALS**, Organic Solids and Inorganic Materials that
are viscous, sticky and stingy, in such unique applications as:

c) Heating of incoming Cold Raw Sludge in Anaerobic Digesters in the Municipal Waste
Water Treatment Facilities as a Hot Water-to-Sludge heater.

d) Recovery of heating energy otherwise lost from treated outgoing sludge in Anaerobic
Digesters in the Municipal Waste Water Treatment Facilities as a Sludge-to-Sludge
Line 10 Heat Recovery Unit.

c) Heating or Cooling of Industrial Slurries as a hot water heat exchanger or a cooling unit

Refer to FIG. 1 and FIG. 2 and FIG. 7

The Heat Exchanger comprises of horizontally permanently fixed heating plates (12) to define
between adjacent heating plates an area of sealed passages for two heat exchanging fluids.

The outer frame comprises of two access doors (20) and two outer walls (26). Two outer
Line 20 door frames (24) to form a permanently fixed rigid structure to provide liquid tight
enclosure.

Each heating plate (12) composed of channels for conducting of the cold or hot liquid
sludge In-line and in Counter-flow fashion.

The heating plate (12) comprises of vertical directional baffles (14) and round solid bars (34)
attached at the end of (14), in order to reduce the risk of plugging with stringy material.

Each directional baffle (14) has a few PRESSURE RELIEF HOLES (37), or (38) or (39) in
Fig. 7. The pressure relief holes has shapes of Square, Triangular of Semi-Circular.
Line 30 Each of said channel means being defined by a pair of said heating plates (12) disposed on
next to the other and by a pair of directional baffles (14 and an internal return bend means
(18).

The internal return bend (18) having a configuration allowing direct access to said channel,
means at least at one end removable, without the necessity to dismantle the entire heat
exchanger, the other end could be permanently fixed and liquid tight.

The External return bends (22) having a predetermined configuration to provide a greater
turbulence of the liquid passing through each said channels, said external return bend being
Line 40 incorporated into and extending outwardly from said walls (26) and permanently attached to
outer door frame (24). The said heat exchanger further comprising of two access doors

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(20) which are removable and sealed in a liquid tight fashion to allow accessibility simultaneously from two opposite directions without dismantling the entire unit, said doors being of substantially flat configuration

Line 47

We Claim.

Line 50

24R-Internal return bends (18) having a predetermined configuration adapted to provide a greater flow turbulence fluid passing through each said channels (as per fig. 1 and fig. 11).

The internal return bend (18) is a rigid continuous flat plate bent in many inward and outward **semi-hexagonal** shapes (fig. 11).

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Line 60

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38R-Each directional baffle (14) has a few **PRESSURE RELIEF HOLES** (37), (38) or (39) in fig. 7. The pressure relief holes are located at the extreme BOTTOM or Top, and have shape of Square, Triangular or Semi-Circular.

Line 70

THE PRESSURE RELIEF HOLES (ORIFICES) ALLOW the REDUCTION OF PRESSURE FROM BUILD UP, IN CASE OF BLOCKAGE BETWEEN ADJURING CHANNELS.

The pressure relief holes are located at the extreme of the directional baffle (14) where the liquid starts to fill up.

Line 80

40R-The Inlet flanges (28) and (30) comprise a **unique transition** from **SQUARE CHANNEL to ROUND TUBE, for Liquid Fluids** adapted to connect said inlet in a special manner, which **will cause any blockage to occur outside, before or after, of the heat exchanger,** due to the reduced passage AREA of the liquid.

With added feature of possibility to put 2 Flanges, like that, in serial and connected in the narrowest side.

When the two transitions in Fig. 18 and Fig. 19 are connected together at the rectangular narrower ends, they form a natural restriction in which preferred location plugging first occurs

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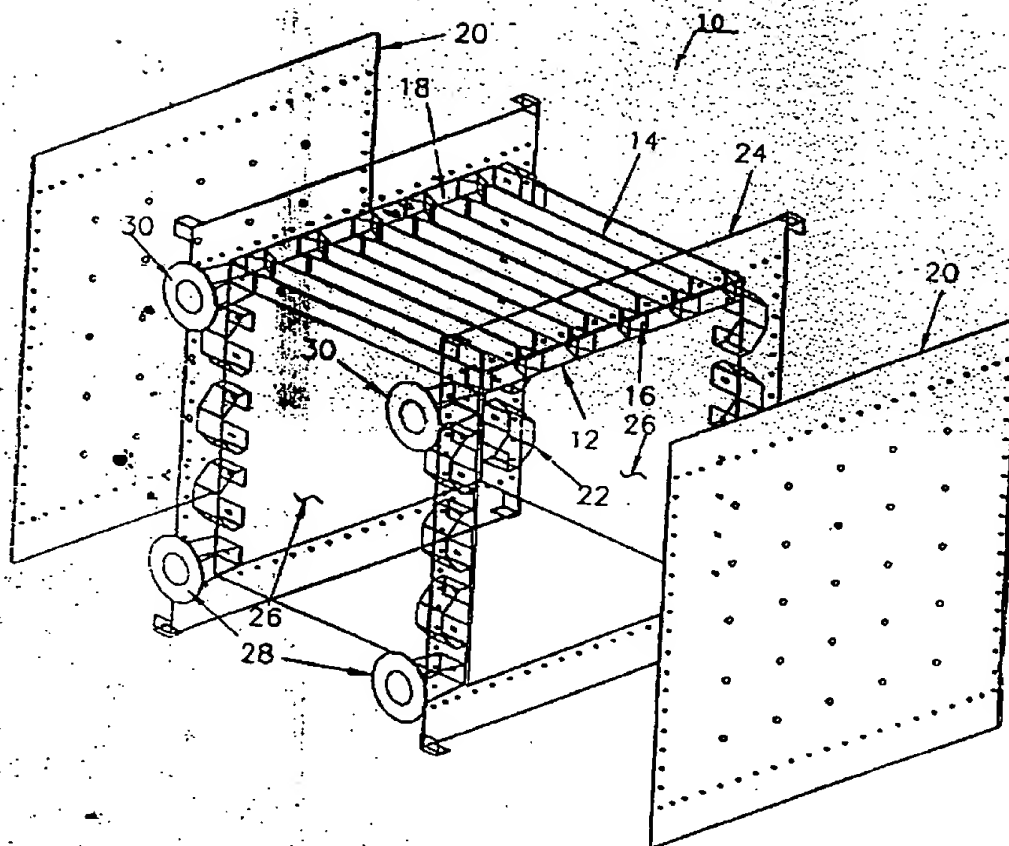


Fig. 1

13
15

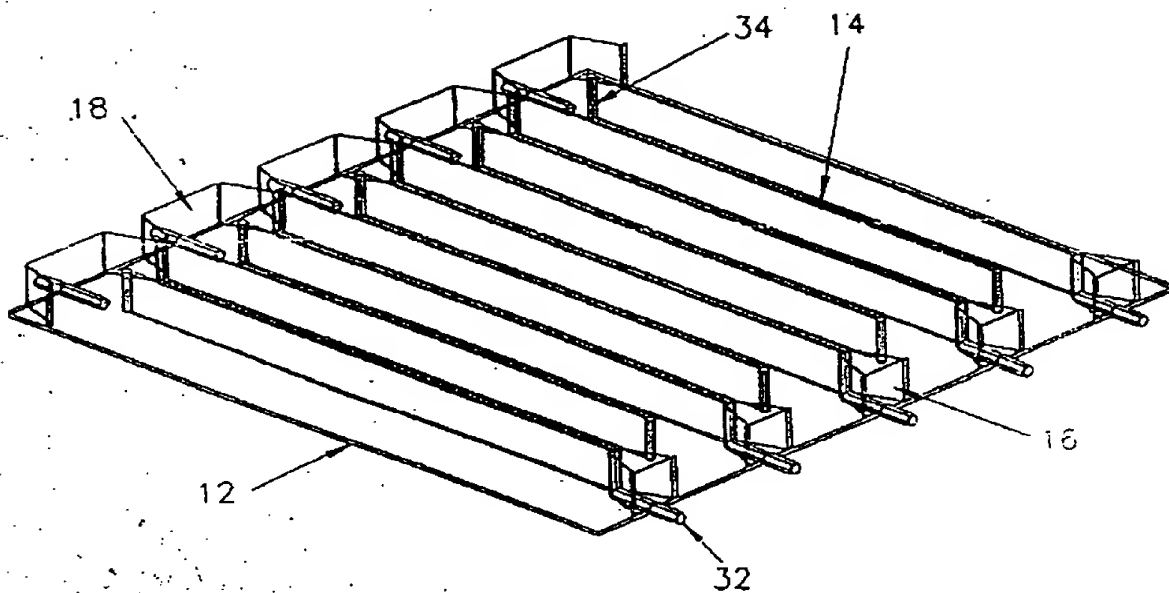


Fig. 2

14
8

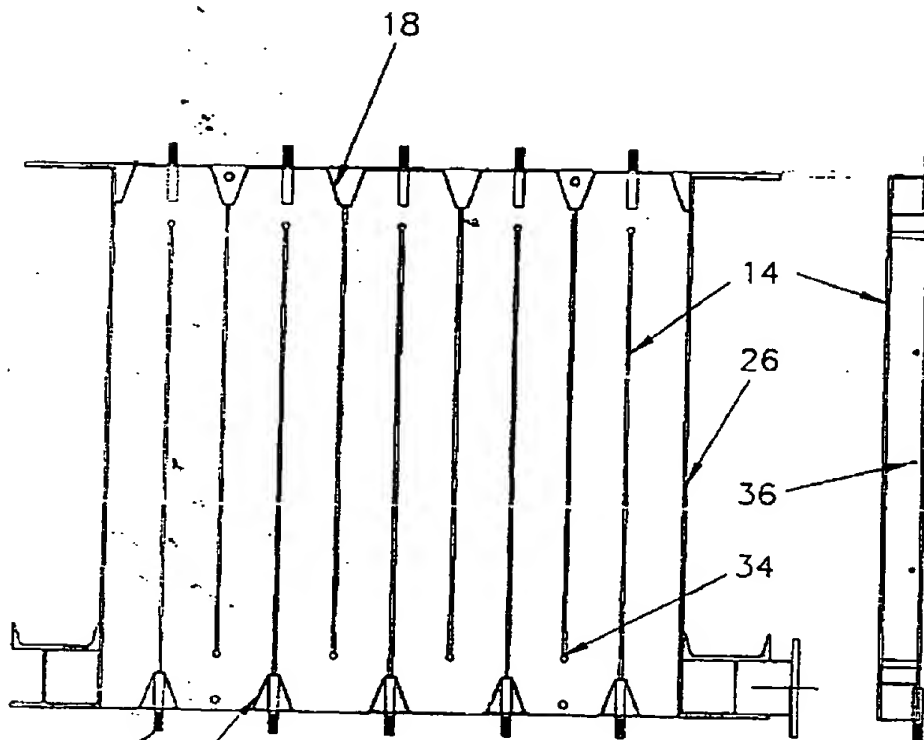


Fig 3

Fig 6

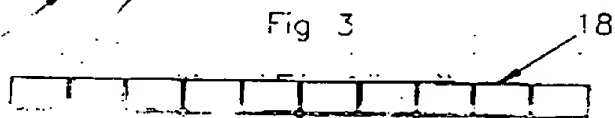


Fig 4

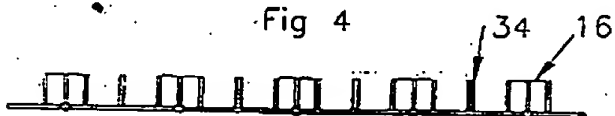


Fig 5

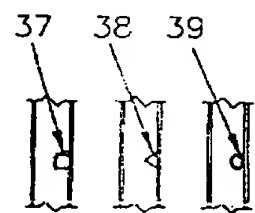


Fig 7

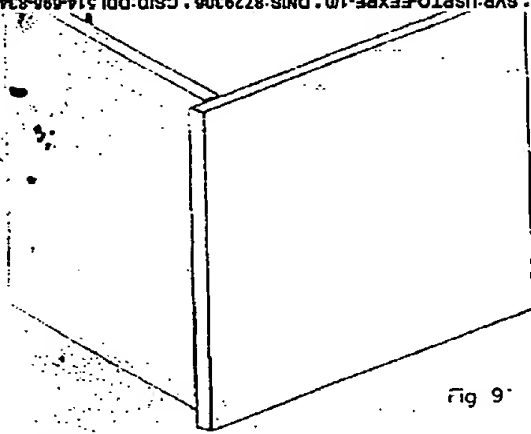


Fig 9

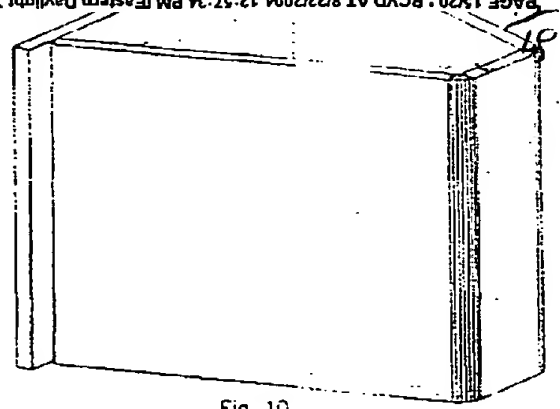


Fig 10

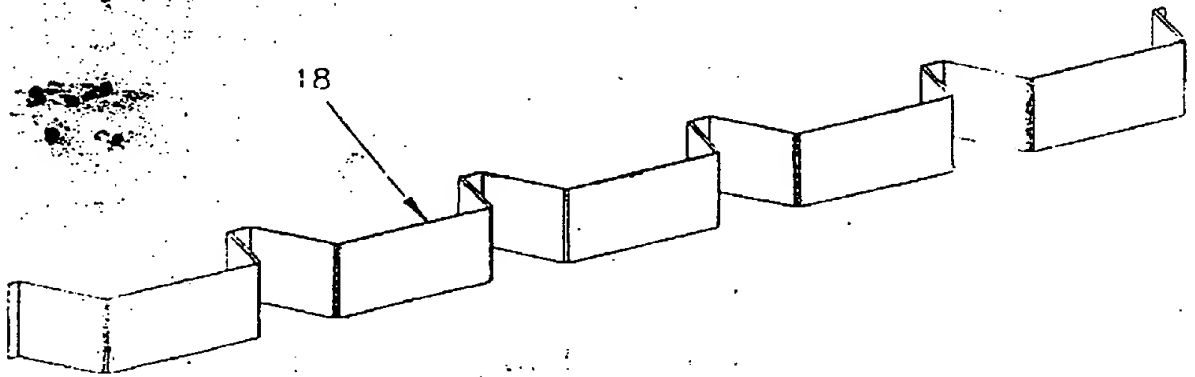


Fig 11

81
71

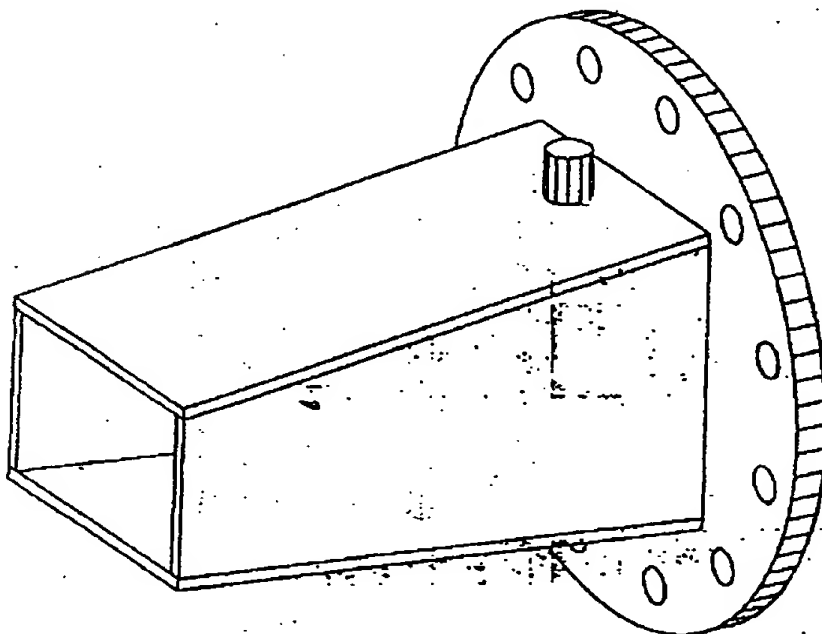


Fig 18

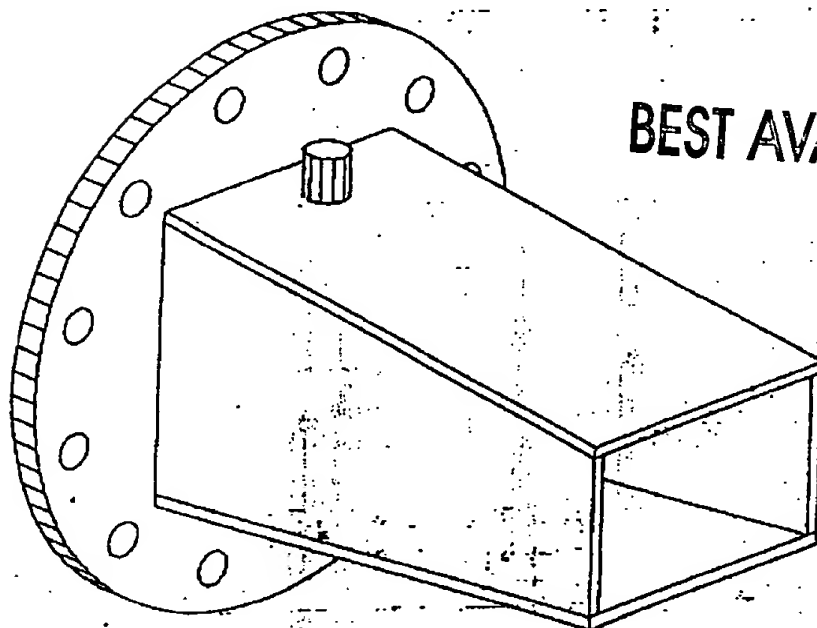


Fig 19

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PTO/SB/17 (10-03)

Approved for use through 07/31/2005. OMB 0651-0032
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

FEE TRANSMITTAL for FY 2004

Effective 10/01/2003, Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27.

TOTAL AMOUNT OF PAYMENT (\$)

Complete if known

Application Number	081418286
Filing Date	04/07/05
First Named Inventor	SCHWARTZ ERWIN
Examiner Name	AT KINSON
Art Unit	HEAT EXCHANGER
Attorney Docket No.	

METHOD OF PAYMENT (check all that apply)

☐ Check ☒ Credit card ☐ Money Order ☐ Other ☐ None

☐ Deposit Account:

Deposit Account Number: _____

Deposit Account Name: _____

The Director is authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Credit any overpayments

☐ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 770	2001 385	Utility filing fee	
1002 340	2002 170	Design filing fee	
1003 530	2003 265	Plant filing fee	
1004 770	2004 385	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	
SUBTOTAL (1) (\$)			

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Extra Claims below Fee Paid

Total Claims: _____ 20** = _____ X _____ = _____

Independent Claims: _____ 3** = _____ X _____ = _____

Multiple Dependent: _____

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1202 15	2202 7	Claims in excess of 20	
1201 85	2201 43	Independent claims in excess of 3	
1203 290	2203 145	Multiple dependent claims, if not paid	
1204 85	2204 43	Reissue independent claims over original patent	
1205 15	2205 7	Reissue claims in excess of 20 and over original patent	
SUBTOTAL (2) (\$)			

**or number previously paid, if greater. For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	2053 65	Non-English specification	
1812 2,520	1812 2,520	For filing a request for expedited examination	
1804 920	1804 920	Requesting publication of SIR prior to Examiner action	
1805 1,840	1805 1,840	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 420	2252 210	Extension for reply within second month	
1253 950	2253 475	Extension for reply within third month	
1254 1,480	2254 740	Extension for reply within fourth month	
1255 2,010	2255 1,005	Extension for reply within fifth month	
1401 330	2401 165	Notice of Appeal	165
1402 330	2402 165	Filing a brief in support of an appeal	
1403 290	2403 145	Request for oral hearing	
1451 1,510	2451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,330	2453 665	Petition to revive - unintentional	
1501 1,330	2501 665	Utility issue fee (or reissue)	
1502 480	2502 240	Design issue fee	
1503 640	2503 320	Plant issue fee	
1460 130	2460 130	Petitions to the Commissioner	
1807 50	2807 50	Processing fee under 37 CFR 1.17(a)	
1806 180	2806 180	Submission of Information Disclosure Stmt	
8021 40	28021 40	Recording each patent assignment per property (times number of properties)	
1809 770	2809 385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 770	2810 385	For each additional invention to be examined (37 CFR 1.129(b))	
1801 770	2801 385	Request for Continued Examination (RCE)	
1802 900	2802 900	Request for expedited examination of a design application	
Other fee (specify): <u>TRAVEL FOR INTERVIEW</u>			
*Reduced by Basic Filing Fee Paid			
SUBTOTAL (3) (\$)			165

SUBMITTED BY: <u>SCHWARTZ ERWIN</u>		(Complete if applicable)	
Address: <u>SCHWARTZ ERWIN</u>	Registration No. (Assign/Agent): _____	Telephone: <u>514-696-7361</u>	Date: <u>22/08/2004</u>

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.17 and 1.27. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing this form, call 1-800-PTO-9199 and select option 2.



Application No. 08/418,286

CONCLUSION

Therefore, the instant petition under 37 C.F.R. §1.137(b) hereby is granted.

The instant application is forwarded to Technology Center 3400 to await the filing of the Appeal Brief and fee by Petitioners, pursuant to the regulations at 37 C.F.R. §1.192.⁹

⁹ The regulations at 37 C.F.R. §1.192 provide:

§1.192 Appellant's brief.

(a) Appellant must, within two months from the date of the notice of appeal under §1.191 or within the time allowed for reply to the action from which the appeal was taken, if such time is later, file a brief in triplicate. The brief must be accompanied by the fee set forth in §1.17(c) and must set forth the authorities and arguments on which appellant will rely to maintain the appeal. Any arguments or authorities not included in the brief will be refused consideration by the Board of Patent Appeals and Interferences, unless good cause is shown.

(b) On failure to file the brief, accompanied by the requisite fee, within the time allowed, the appeal shall stand dismissed.

(c) The brief shall contain the following items under appropriate headings and in the order indicated below unless the brief is filed by an applicant who is not represented by a registered practitioner:

(1) *Real party in interest*. A statement identifying the real party in interest, if the party named in the caption of the brief is not the real party in interest.

(2) *Related appeals and interferences*. A statement identifying by number and filing date all other appeals or interferences known to appellant, the appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) *Status of claims*. A statement of the status of all the claims, pending or cancelled, and identifying the claims appealed.

(4) *Status of amendments*. A statement of the status of any amendment filed subsequent to final rejection.

(5) *Summary of invention*. A concise explanation of the invention defined in the claims involved in the appeal, which shall refer to the specification by page and line number, and to the drawing, if any, by reference characters.

(6) *Issues*. A concise statement of the issues presented for review.

(7) *Grouping of claims*. For each ground of rejection which appellant contests and which applies to a group of two or more claims, the Board shall select a single claim from the group and shall decide the appeal as to the ground of rejection on the basis of that claim alone unless a statement is included that the claims of the group do not stand or fall together and, in the argument under paragraph (c)(8) of this section, appellant explains why the claims of the group are believed to be separately patentable. Merely pointing out differences in what the claims cover is not an argument as to why the claims are separately patentable.

(8) *Argument*. The contentions of appellant with respect to each of the issues presented for review in paragraph (c)(6) of this section, and the basis therefor, with citations of the authorities, statutes, and parts of the record relied on. Each issue should be treated under a separate heading.

(i) For each rejection under 35 U.S.C. 112, first paragraph, the argument shall specify the errors in the rejection and how the first paragraph of 35 U.S.C. 112 is complied with, including, as appropriate, how the specification and drawings, if any,

(A) Describe the subject matter defined by each of the rejected claims.

(B) Enable any person skilled in the art to make and use the subject matter defined by each of the rejected claims, and

(C) Set forth the best mode contemplated by the inventor of carrying out his or her invention.

(ii) For each rejection under 35 U.S.C. 112, second paragraph, the argument shall specify the errors in the rejection and how the claims particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(iii) For each rejection under 35 U.S.C. 102, the argument shall specify the errors in the rejection and why the rejected claims are patentable under 35 U.S.C. 102, including any specific limitations in the rejected claims which are not described in the prior art relied upon in the rejection.

(iv) For each rejection under 35 U.S.C. 103, the argument shall specify the errors in the rejection and, if appropriate, the specific limitations in the rejected claims which are not described in the prior art relied on in the rejection, and shall explain how such limitations render the claimed subject matter unobvious over the prior art. If the rejection is based upon a combination of references, the argument shall explain why the references, taken as a whole, do not suggest the claimed subject matter, and shall include, as may be appropriate, an explanation of why features disclosed in one reference may not properly be combined with features disclosed in another reference. A general argument that all the limitations are not described in a single reference does not satisfy the requirements of this